Notebook Series -- Notebooks by Experimenters Other Than Edison
General Experiment Books -- M. R. Hutchison Book
Notebook, N-13-02-27

This notebook was used by Miller Reese Hutchison during February-May 1913 for notes on a variety of subjects, most relating to his work on the storage battery. The entries are organized by project. Included are notes pertaining to electric delivery wagons, electric self starters, a rotary field synchronizer, an automatic polarizing rectifier, battery tubes and grids, tube-loading machines, and various other machines for manufacturing batteries. Also included are notes about dictating machines, kinetophones (motion pictures with sound), various components of the home kinetoscope such as a rotating carbon arcs and acetylene burners, and a motor-driven professional kinetoscope. Several entries contain comments by Hutchison about Edison's requests and suggestions as well as remarks about his conversations with the inventor. There are also comments by Hutchison about the strengths and weaknesses of experimenters Zachariah P. Halpin and Charles W. Norton. The front cover is labeled "Status of Experiments Edison Laboratory M. R. Hutchison" and "To Be Kept on My Desk For Mr. Edison's Inspection." The book contains 150 numbered pages; pages 99-150 are blank. At the end of the book are 10 unnumbered pages regarding improvements to Hutchison's summer home in Minnesota followed by a 4-page index. The index has been filmed first.

	Page
No. 3 Delivery Wagon -	1
Electric Self Starter	2
Rotary Field Synchronizer	3
Automatic Polarizing Rectifier 86-91 &	4
Changing 1/4" Loading Machines to 3/16" -	5
" " Tube Drawing " " "	6
Automatic Ringing Machine 1/4"	7
3/16" Tubes	8
S-6 Cell with New Grids -	9
Rotary Carbon Arc	10
H.P.K Acetylene Burner	11
" Gas "	12
" Incandescent Battery Lamps	13
" " 110 Volt "	14
" 30 V. Lamp on 110 V. with commutator	15
" 15 ampere arc	16
" 220 Volt Nernst Lamp	17
" Gas-Air Torch for Burner	18
" Advertising Loop device for Advertising	19
" Friction Tension on Takeup	20
" Improved Lamp House	21
P.P.K. Motor Driven Kinetoscope	23
Printing Machine Lamps in Plant	25
Packing of Disc Machines for Shipment	26

Kinetophone – Piano 58
Stereoscopic Lantern Slides – 59
Kinetophone Studio in Laboratory 60
Distortion Correction for Kinetoscopes used in Vaudeville Houses 61
Safety Incandescent Lamp for Mines – 62
Flaming Arc Lamps & Edison Battery – 63
Automatic Booming Device for Elec. Motors – 65
Daylight H.P.K. Window Display – 69
Telephone Reproducer (Bus Phone) 71
Voltage Controller for Marine Work – 68
Film Developing Machine 69
Stereoscopic Kinetoscope Screen 70
71
Start & Stop Hand Trip, Bus Phone. 72
Pneumatic Start & Stop Attachment for Typewriters 73
Cheap Hand Shaving Machine – 74
Daylight Screen – Box 75
Locomotive Head Light – 76
Special 60 Volt Motor – 77
Professional Kinetoscope Incandescent Lamp – 78
H.P.K. Mercury Lamp with diaphragm 79
Synchronous Motor Kinetophone Drive – 80
Step by Step Synchronizing Device – 81
Elimination of Flicker in P.P.K. machine 82

Business Phonograph – New Design 27
Spring Motor Bus. Phonograph 28
Business Phone New Recorder 29
" " " Reproducer 30
Compensating Screw for Bus. Phone Collapsible Mandrel 31
Bus. Phone Electro Magnet Repeat 32
" " Electro Mag. Start & Stop 33
Telephone Recording 34
" Relay 35
Third Brush Self Booming Motor 36
Disc Record Dept Equipment 37
Cylinder Record Dept Equipment 39
Iron Loading Machine, New Plant 41
¼" Tube Drawing Machine, " " 42
House Lighting Engine Tests 43
Repair of Laboratory Switchboard 45
Welding Pockets & Studs to grids 46
Optical Printer for H.P.K. Lantern Slides 50
H. P. K – 15 amp machine 51
Printing machine for Prof. Film – 54
Double Kinetophonograph – 55

Double Row of Pictures on P.P.K Jelen — 83.
Home Kinetoplume 84
5-6 cells - New grids. 85
Rectifier - Lead Batt. 86
" 5 units in series 87
" 2 wave 2 units 88
" Single Wave 50 amp. 89
" Spring Cushion — 90
" Sliding Contact — 91.
Mining Lamp Reflector 92
Spring Motor Kinetoplumograph 93.
Quartz Reflector for A.C. arcs — 94
Boxwood friction on Phonu. motors — 95
Magnetic Blower for A.C. arcs 96

No 3 Delivery Wagon

3/27/13- Run 2700 miles.
Wheel Bushings, jackshaft bearings, brakes being renewed. Ready for test on 3/4/13

3/6/13- On Road. Making better time because of new bearings all round &c. New tires on all wheels.

3/13/13- On Road. Has gone 1600 miles without mishap. Only 400 more to go.

3/20/13- Endurance run + completed with good score. Mileage test shows 33 miles per charge. Rather low but may be due to:
1- Cells have not had any renewal of solution for over a year. Sewer service.
2- Sand + grit in bearings.
3- Badly worn chains + sprockets.
Will have test made on Battery

3/22/13- Watts lost in Motor = 11.25
" " " Jackshaft + chain 16.75
" " " Rear Wheels + chain 16.8
Total 44.80

By substituting Belt for chain to drive the jack shaft Journal only 5 watts to turn shaft. This proves big loss in chain running at such high speed.

By substituting Silent Chain for Link Chain can reduce loss & provide 39 watts available for vehicle perpulsion. One brake dragged slightly so will make another mileage test.

3/27/13.- Last mileage run showed 41.7 miles, because we removed slight drag on brake and overcharged the battery. Made test on driving wagon with full load up Hill in Park, the fields being separately excited by 300 amperes (3450 amp. turns per pole) from 2-6E cells. (By cutting down the amper turns the power is decreased) The wagon ran at 6.29 m.p.hr. on level and 3.18 m.p.h. on hill. Batteries gave to 58.3 Cs the rpfield &c. 600 amps. ammeter sent to Weston to be checked. Test to be resumed when rec'd.

4/3/13- Has two varying field current or grade but best can do is 50% of level speed on Park hill. Working on arrangement max. speed on level by weakening field.

Electric Self Starter

3/4/13- Buick car equipt with starter consisting of Bijur Motor & worm gear. Now wiring car & installing dynamo &c.

3/10/13- Starter is fine. Generator being removed.

3/13/13.- Removed dynamo & find relation of dynamo speed and car speed about right. To provide cutouts now. Probably finished next week.

3/20/13- Waiting for chain & sprockets from dynamo. Link Belt Co. About a week. Sent a hurry up letter.

3/26/13- Still waiting for chain & Sprockets. Another letter.

4/3/13- Chain & Sprockets expected on 7th inst.

4/24/13- Chain & Spkts in & going in the car. Klein brought new motor & am putting that in. Be ready in about a week.

Rotary Field Synchronizer.

3/4/13- Rigged up in model outfit to test Commutator too small.

3/13/13- Rain & lectures OK. Can return over of Synchronizer and pick up OK. But the Kinetoscope is not self starting if stopped while Motor is running. Motor now busy with putting some starting coils on. Prospect good.

3/20/13- Works OK if start up when motor starts up on phonograph. But if stop the Rotor on Synchronizer, it won't start again. This is no detriment as no occasion to stop rotor. Can operate the Synchronizer same as if driven by cord. Photographed complete outfit in detail & will proceed to try out other schemes.

3/26/13- Getting patent drawings made up.

Automatic Polarizing Rectifier.

3/4/13. Experimental models made to date show well. Will have 4 commercial models ready shortly, for efficiency & life tests.

3/6/13. Will have about 12 units ready to be put on tests by end of next week.

3/13/13. The about 12 units about ready. Found necessary to mount back contact more firmly.

3/20/13 - Rectifier running 1 unit night & day, charging 6-B$^{\text{b}}$ cells @ 20 amps. Found copper contact is not mechanically strong enough to stand contact vibration also must adjust contact position from time to time rectifier. Making up samples.

3/27/13 - Jerry reports other work has held up rectifier. Has devised new form of contact & about to test.

4/3/13 - Carbon contacts wear badly. Expr. with spring support of back carbon etc.

4/10/13 - Various forms of contacts being tested. Making up sliding contact device.

See pages 86-87 88-89-90-91.

Changing 1/8" machine to load 3/16" tubes. (Roscoe Smith)

—x—

3/4/13 Roscoe Smith on job.
3/18/13 - Going on OK.
3/20/13 - " " "

Changing Tube Drawing Machine
Jan 3/16 " tubes.

—x—

3/4/13 Rosen Smith on Job.
3/20/13. " " " "

Automatic Ringing Machine
for 1/4" Tubes

3/4/13 - Doing good results. Working right along.

3/5/13 - 2000 tubes went through automatic ringing machine. OK.

3/20/13 - 22,114 tubes finished in this machine since start. Good results. Working on new ringing machine for sorting out damaged rings.

4/27 - 40.000 tubes completed to date.

4/24 - 93,474 " " " " .

3/16" Tubes.

3/4/13 Cap Dia Finished

4/24/13.- Smith reports tests as follows
#11874 — Standard 1/8" tube polarizations
1st Run .850 2nd .967, 3rd 1.063
#11875 — cut .004 Stock
1st .823, 2nd .940 3rd 1.047

These tubes have half the amount of active material as the 1/4" tube
The 1/4" tube averages 1.4 to 1.5, so the 3/16" tube is 60% greater capacity per unit of active material than the 1/4" tube.
If tubes over in A4 cell as above, will mean 240 amp. hrs. but may have to put the equivalent active material into an A5 can.

S-6 New Grid Cell

—x—

3/4/13. Completed, filled & delivered to HH Scott for test 3/27/13.

Photos made of exterior and interior.

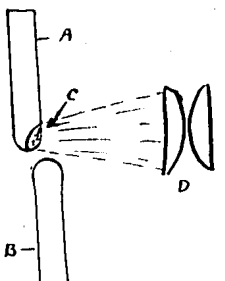
3/17- On test in series with old S-6. will send over curve of comparison. Voltage coming up. Indications that the increased & proportioned risers on grids will result in higher voltage average on discharge at 3 hour & 1 hour rates.

Rotating Carbon Arc.

3/4/13 -

3/20/13. Norton made one up but rather rickety and unsatisfactory. Has the germ of a good idea but needs application of brains. Will get after it soon as I can spare the time.

Ball says the rotating carbon will defocus the main object - to get a crater from which to reflect the light, because:



A = Top carbon
B = Bottom "
C - Crater formed on side of A
D - Condenser.

as shown, the light is projected from crater into condenser. Rotating the top carbon would defocus this.

The lack of "straightness" in carbons makes this an impractical expedient. Further more you don't want the arc air poised but on side of top carbon, and crater must form.

H. P. K. Acetylene Burners.

3/10/13 — Halpin experimenting on various burners.

3/20/13 — Not much headway. Halpin is an excellent man to test our apparatus but has no originality. Will put a good mucker on this as soon as I can spare one. No especial hurry because we must get the acc through the insurance people before springing a gas flame proposition on them.

3/27/13. — Testing burner with gas orifice .006" – .010" Mixing chamber .093" – .140", gas nozzle .093 – .109 & .125". Gas pressure from tanks raised up to 4 – 12 & 13 lbs. □". Flame very good & mantel bright but between mantel and condenser a blue flame seemed to burn the white rays from mantel. Not satisfactory as operated in machine

H.P.K. Gas Burners.

3/10 - Halpin at work on them. Results not satisfactory yet.

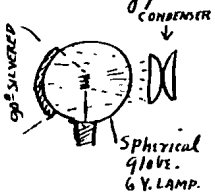
3/20/13. - Same as on p. 11.

H.P.K. Incandescent Lamp-Battery

3/10- Wrote G E Co Ltd and 6 V. small filament lamps they used in printing machine test.

3/20/13. Have the lamps but no mirrors. Can get one of the 6" mirrors they make into our H.P.K. Lamp house.

Briggs is now at work on this proposition



will not work with C. System of lenses but OK. with B. system. & A system.

3/26/13.- Squirted a fine 48" picture with 6½ V. 6½ amp lamp today. Silvered back half of lamp. Have 12 - 6 V. 50 cp lamps and 12 - 6 V. 50 cp lps. coming next Monday.

HPK Incandescent Lamps
110 V.

—— X ——

10/20/13.- Working over 6 V. lamp first. More difficult with 110 V. because of larger size of globe - and larger filament loop.

H.P.K. Commutator and 30 V. lamps on 110 V. circuit

—x—

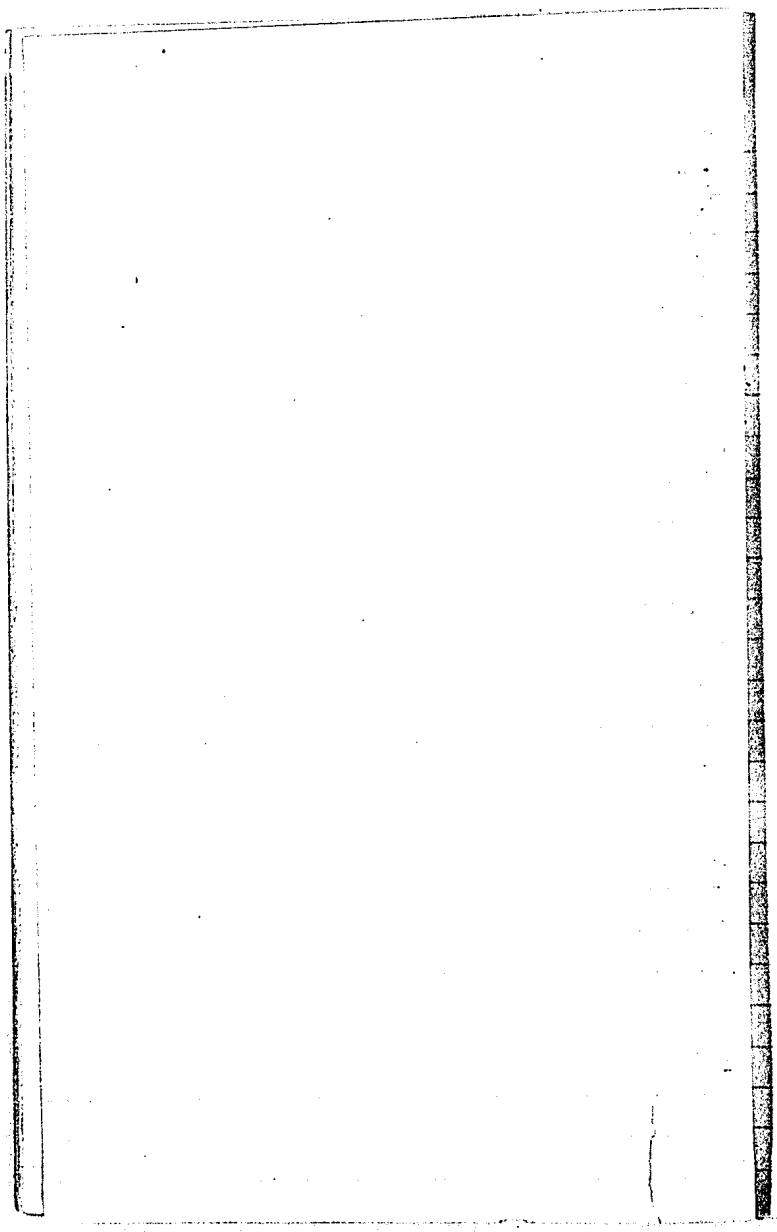
3/20/13. Briggs will go out to this as soon as have some headway on 6 V. lamps.

3/26/13. Had commutator put on H.P.K. machine with brushes arranged so I could get any adjustment of "light on" proportion ~~to~~. Adjusted it to allow light to be on 3/4 of the time. Put it on 6 V. 30 cp. lamps with back half silvered, and ran a 72" picture in Committee room on 8 cells Ed. Battery. Fine. Then Dyer gave out 10 cells on. Burned out the leading in wire from base to filament but filament remained intact. Great stunt.

4/3/13 - Waiting for lamps. Redesigned commutator and lamp sockets.
Have 12 - 30 cp. 6 V. concentrated helix, 5 amp
12 - 50 " " " " 10 "
lamps coming.

HPK. 15 amperes AC.

10/20/13.– Ball has built one lamp house and has Johnson at work on it. Expects to finish very soon.



17

H.P.K. 220 V. Neon Lamp Ballasts

10/20/13- The only place we can use this is in Europe. European Company is taking care of this over there

H.P.K. "Brazing Torch"
Gas — air Burner

—— × ——

10/11/13 Will put Briggs on this soon

H.P.K. Advertising Loop Film Scheme

10/20/13.- Ball has Johnson at work on this. Ball has a 40 ft. loop working and within a short time will have it completed commercially.

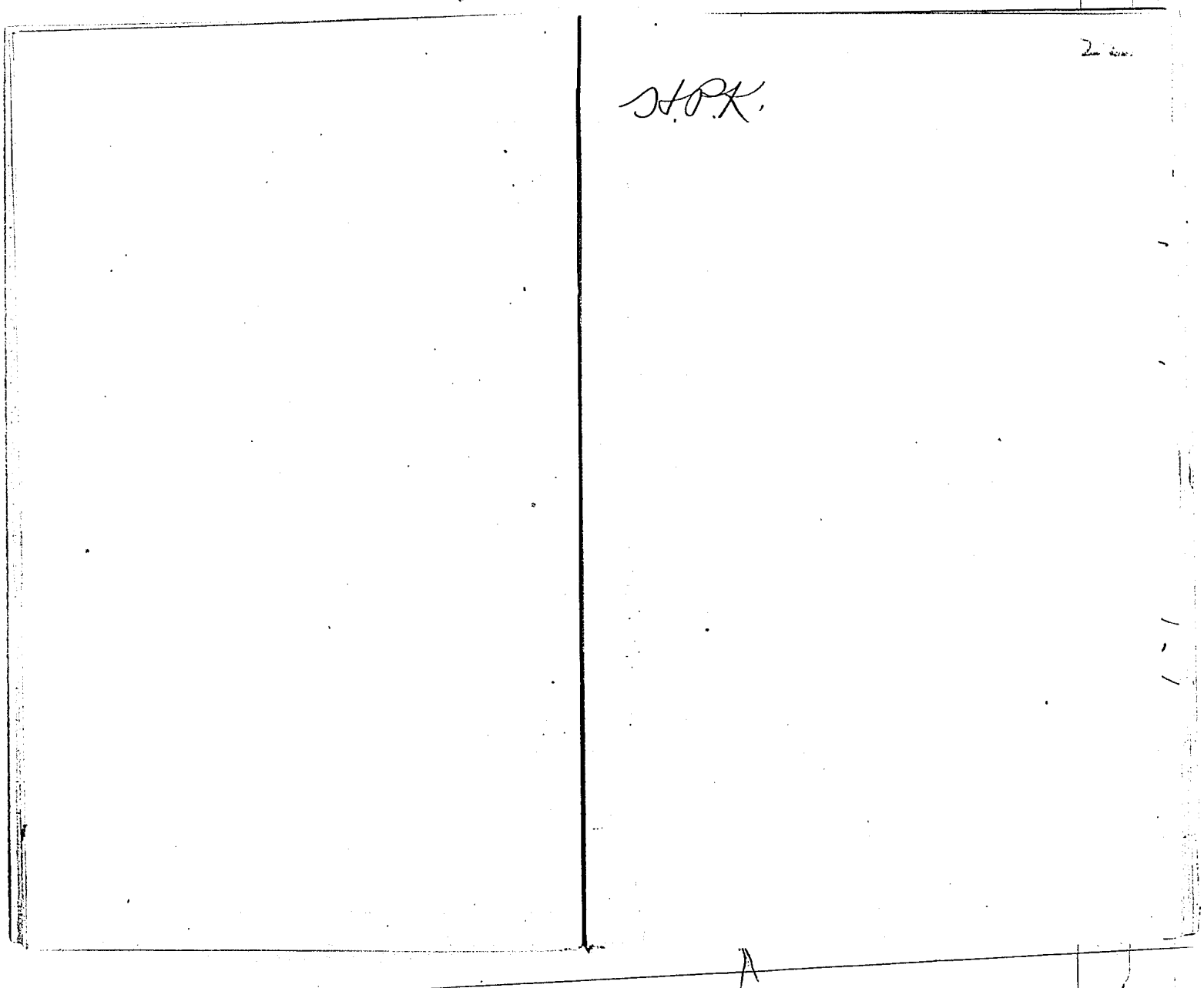
HPK - Victim Tension Take up.

—x—

10/20/13 - Some trouble experienced by failure of takeups to work reliably. Hall says he can put an extra roller clutch on each reel spindle that will overcome this. He will get after this very soon.

H.P.K. Dunsmuir Lamp House

10/20/13.- Lamp house having hinged cover. Back enclosed. Finished, but too expensive to move. Will reconstruct a cheaper


2 in.
S.P.K.
A

Professional Kinetoscope
Motor Driven

5/20/13.- Has gotten the noise out by proper relation of eccentricity in Accelerator. An screw 290° + slotta in 70°. This relation of obturation + obturation can be adjusted in desired proportion.

Second machine being made up. Expect to have completed by about May 15.

Proj. Kineto. (Continued)

Printing Machine Lamps

3/4/13 -
Both motors running on 110 V. A.C.
One Incandescent operating on 110 V. D.C.
Tests made at D.E.Co. (See D.E.Co. letter)

3/20/13 - All the printers in Jamieson Bldg operating on Incandescent Lamps, Tungsten 100 Watt, on A.C. from the Public Service. Very satisfactory - all Nernst Lamps discarded.
Printing machines driven by A-C motors.
Also the Dark Rooms have a double throw switch so that in case of failure of the Power D.C. service, Lamps therein can be operated on the A.C. system.

Packing of Disc Machines

3/4/13

Have a Victor case in which they use our excelsior &c. Will look it over and see if can get any points in packing Discs players.

New Design Business Phone.

3/14/13

Model practically completed, held up on electric recorder.

3/26/13 - Holland's report not yet in.

3/27/13 - No further work done.

Small Spring Motor
Dictating Machine

3/4/13.

Completed except mounting the recorder & reproducer. WHH.

3/20/13 - Holland's report received.

3/27 - Completed & working nicked plated & Enamelled. Expect to have ready for Committee next time work.

New Business Phone Recorder

3/14/13 - Trouble with varying sizes of records. Coming along.

3/20/13 - Holland's report not yet in

3/27/13 - The slip breaking has been given some radius as the movement of the weight and permanently attached to the weight. Made up & tried. Satisfactory. Necessitates die castings & still question as to whether advisable to adopt it.

New Business Phase Reproducer

—x—

3/4 Finished and in work. Very good reports. No skipping.

3/20/13 - Finished. OK.

Compensating Scheme for the Collapsible Mandrel
(Business Plans)

3/14
Condensite & H Rubber schemes too expensive.
Spring Compensating device appears satisfactory.

3/27/13. - Last model of collapsable mandrel with slotted end disc OK from 40° to 110° Fahr. Cylinworth OK's. Now changing four regular collapsable mandrels to include compensating feature for commercial test before regular production.

Electric Magnetic Repeat

Business Plan.

3/4 Model operates OK in D.C. but too noisy in a.c. Propose to try a dash pot arrangement to prevent noise. Held up at present on new arm development

3/20/13 - Holland's report not yet in

3/27/13 - No further development since last report. Trial model depends on development of new traveling arm now under way.

Electric Magnetic Start Stop
(Bus. Phone)

314 Commercial Design not yet completed

3/20/13 - Holland's report not yet in

3/27/13 - ~~arrayed / route shipping~~ retaining means yet in can be applied to & removed from speedwing. this.

3/27 - No further development since last report.

Telephone Recording
(Bus. Phone)

3/4
Holland reports very satisfactory records.
Problem of feeding recorder mechanism in various sizes of cylinders is solved.
Range of instrument is adjustable.
3/20/13 - Holland's report not yet in.
3/27/13. Still experimenting with Loom for disk Set. Progress. The new direct acting recorder is working OK, but final design held up until new arm is finished. We made perfect record of McKimball's speech at Eastern Association of School Teachers meeting. The Stenographer and stenographic operations both corrected their notes from our record.

Telephone Relay and Telephone Message Recorder

X

3/1 Very satisfactory test on this scheme but as prescribed up

3/20/13- No further report from Hopkins

3/20/13- Hope to finish model by end of this week.

Thirty Brush Governor Jr
(Bus. Power motor)

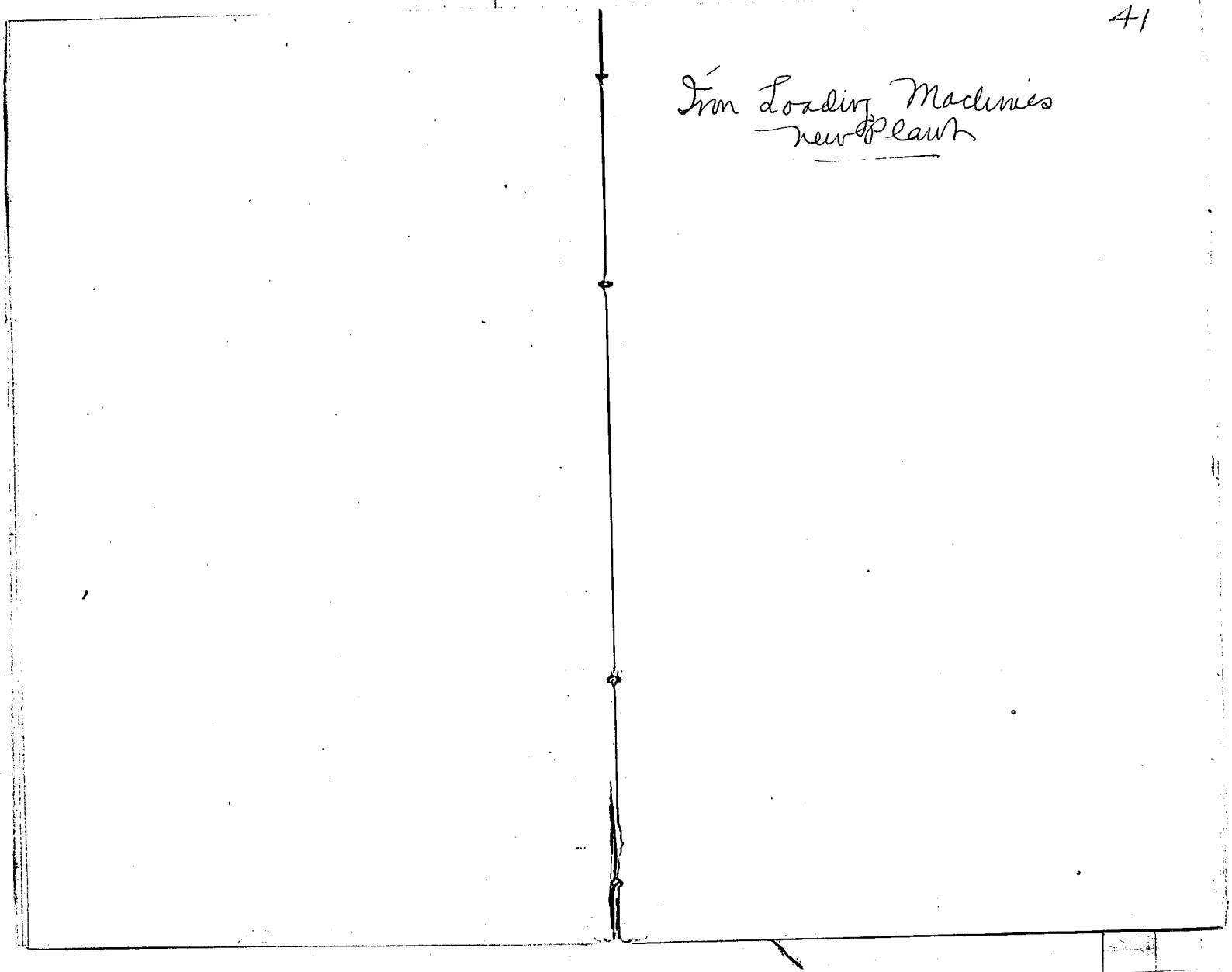
3/4 OK m & C. motors & on some a.c. motors, but margin is very small. Held up at present
3/20 Sour stunk this is very practical
3/27/13 – No further work done.

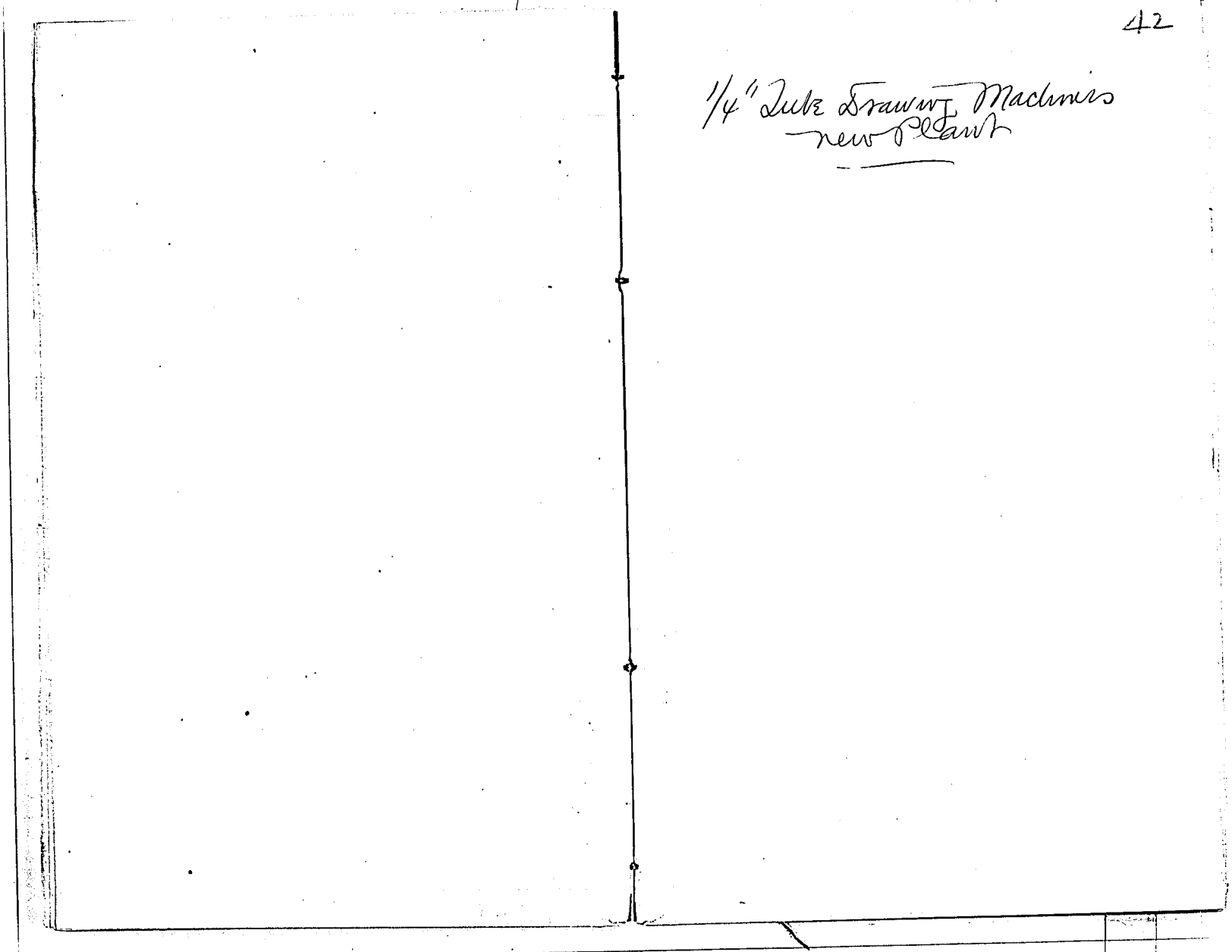
Disc Record Rpt Equipment

Cylinder Record Dept Equipment

See Committee report

Iron Loading Machines
New Plant





1/4" Tube Drawing Machines
new Plant

House Lighting Engines &c.
Dreta

2/20/13- Power in Boston attending auto show. Dreta held up.

Repair of Switch Board Lab. Garage

3/10/13 – Instruments returned back from Washington.

3/20/13 – Instruments in and work in progress. Will be able to boost at 100 amps when done.

4/3/13 – Finished

Welding Pockets & Tubes to Grids &c. of Edison Battery

3/15/13

Mr Edison desires tests made as follows re contacts in Battery.

1- Select enough positive and negative plates, pasted &c., & proceed as below, taking care that said plates are composed of tubes & pockets made up from the same batch of nickel hydrate & iron oxide.

2- Make up one (1) A-4 cell having all the tubes welded to the grids.

3- Make up one (1) A-4 cell having tubes & pockets welded to the grids.

4- Make up one (1) A-4 cell having the tubes & pockets secured as per standard practice but with the plates welded to the spacing washers and washers welded to the poles.

5- Make up one (1) A-4 cell having all tubes & pockets welded & grids and with the plates welded to the washers & as per #4.

6- Make up one (1) A-4 cell normally throughout, for comparison.

7- Put all through the standard forming runs and ~~~~ start in on various tests to determine
a- Internal Resistance
b- Effect of continuing work.

Welding pockets & Tubes & Grids.
— continued —

3/20/13 — Welded some tubes & pockets to grids. Technique OK and now proceeding to make up 3 cells A4 with welded tubes & pockets and 3 others normal, all 6 from same lot of tubes & pockets.

4/3/13 — 3-qt cells with all tubes & pkts welded to grids, & 3 qt cells normal, all from same Ni & Fe mix, in H Brunettes hands for test.

Optical Printing Machine for H.P.K.
Lantern Slides: (Ball)

3/17/13 - Nearing completion. Abrattis discarding plates that are not exactly flat.

3/20/13 - Nearing completion - 90% done. Installing about 1st of month.

H.P. K machine for 15 amp. arc
for School & C use (Ball)

3/17/13. Finished model in 10 days

HPK.

Edvotion Machine Jr
Window Display

2/7 Gall experiments trying Handle
40 feet of film.

Sept. 19

Orpheum Kinetoscope

Hall

3/17/13 – We are now completing a new machine wherein the "bugs" developed by machine we have just finished will be eliminated. We keep present machine in Ser. in exp.

See p. 23

Printing machines for Standard
Film @ all
X
3/17 Bin laid out. Will automatically
select correct exposure for
printing from a negative of any
density.
Simpson on this job

Double Kinetophonograph

—x— 3/20/13.

Mr Edison suggests that to increase the volume of sound and permit of greater distance away from recorder in recording process, that in the reproduction two phonographs be used as follows:

No. 1 phonograph contains motor. First inside of clutch of same, drives by chain & sprocket a counter shaft which in turn drives outside of clutch on No. 2 machine.

No motor on No. 2.

Operator starts motor of #1.

He then puts record on #1 and locates the "click" in record.

He then throws clutch out on No 2, places duplicate record on #2 and locates the "click" point.

Now, both #1 & #2 have reproducers pivots on the "click" spot.

Then throw clutch on #2.

Now when time comes to start phonograph, operator presses

clutch engaging button on #1 phonograph and thus starts up both cylinders simultaneously.

The result is increased volume of sound.

Of course the 2 records can be marked and mandrels on #1 & #2 machines marked so they can be set without so much trouble.

I put this up to Davis today and he expects to alter the two phonographs so as to have same operation next Wednesday.

Watts.

3/24/13 - Works very well. Tried it out.

Watts

Kinetophone Piano

— x — 3/20/13

Mr Edison suggests taking a photo of a man like [illegible] while he is playing, and as he plays, operate perforating machine to produce self playing roll.

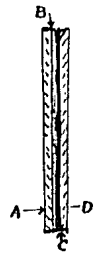
Now reproduce by throwing picture on screen in synchronism with the piano as it plays.

Melville Clarke is, I believe, the suggestor of the idea and Mr E. is writing for a prospectus from him. I will keep track of developments.

Stereoscopic Lantern Slides.

3/20/13

For some months Dall has been talking about using colored glasses — red & green — to view two superimposed pictures.



A = glass side of red emulsion slide.
B = Red emulsion on "A" (Bichromate Potash)
C = Green emulsion on glass D.
D = glass side of green emulsion slide.

The pictures are made on the two slides, with a Stereograph. The slides are placed faces together and when picture is viewed with spectacles having one eye glass red & other green, the effect is stereoscopic.

As soon as the Optical printer is finished will conduct experiments on this.

Kinetophone Laboratory
Studio

31/5/13.

Laying out School film room to divide into three parts.

The North side bay will continue for School film work until House gets his negatives sealed up and into vault.

The middle bay will be fitted up for photographing and recording. Padded sides and floor will be put up in movable shape.

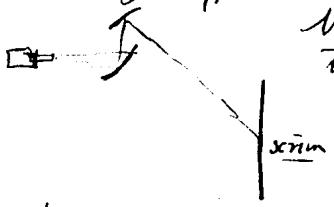
The South bay will be fitted over for Kinetophone projector and plumbing work in connection therewith

Distortion correcting, for Vaudeville houses:

3/20/13. Allison at work on mirror (warpable) so as to correct the distortion now existing in theaters when the Kinetoscope projects into screen at angles of from 25° to 45°. Works very well.

3/26/13- Tested thus our practically troughs by placing Kinetoscope in 3rd floor of Lab, Screen in yard 45° thence from top mirror. Distorted mirror by flexing mirror and produced excellent results. Seen by Walter Miller, Sally, Fox. Allison & Pearsall.

Will try various combinations to minimize results.



4/3/13.- Allison reports "Devised means of correcting poor focus. Poor focus is caused by astigmation caused by warping mirrors. Tried correcting this by introducing astigmatism into objective, but unsatisfactory. Bought negative cylindrical ends to combine with

objective to produce desired astigmatism. OK but does not strongly astigmatize. Ordered another. Work & specifications for patent while waiting for projecting machine to continue experiments.

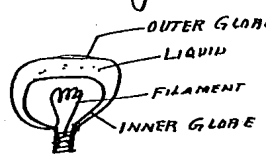
4/10/13- Ground & polished one of the lenses in objective of Kinetoscope.

Improving sharpness of pictures by placing a negative cylindrical lens in front of objective. Sharpness of pictures further improved by placing cylinder lens behind objective. Worked out all possible ways of warping mirrors to correct distortion & have diagrams on drawings.

5/2/13- Edison has secured 2 mirrors and pictures by using 2 mirrors only 7" square, warping them in opposite directions.

Safety Incandescent Lamps for Mining Lanterns

3/20/13.



Mr Edison has wanted these lamps made up for some time for use in mining lanterns.

The scheme is to put some kind of liquid into the outer globe so that in case the globe is broken - smashed, the liquid will be drawn in by vacuum in inner globe and prevent filament from giving inflammable gases. Can't seem to get these lamps made up. Have seen engineers in D.C.C. lamps 5 per & have many promises but nothing doing yet. Will chase up again.

4/23/13- After "burning" in cap lamps for 10¼ hrs. no steam was generated and the lights burned OK. Ordered 6 more from D.C.C. to make explosion tests.

5/2/13- Ordered 25 lamps from D.C.C.

Flaming Arc Lamps in Series with Edison Battery as resistance.

— X —

1/6/13- Excello Lamps used. 2 lamps in series. Resistance shunt cucuited. One (1) B-2 cell may be charged for every 1.07 volts in excess over 90 V. D.C. - 12 cells may be charged when line voltage is 110; 15 when 115 + C.

With Battery wholly discharged (or nearly so) initial current is 14 to 15 amps. and in about an hour ~~stops~~ tapers down to 9 amps. during 1st hour & remains there.

A charge of 6½ to 7 hours will yield rated capacity. (40 a/h)

Operation of lamps seemed quite normal if using 12 cells on 110 V. & 15 cells on 115 V.

Remains for Lamp people today whether 15 amps initial current & 9 amps normal current satisfactory to them.

Wrote lamp people, forwarding report on Jan 10th. No answer.

2/20/13- Rec'd letter not answering this

questions + suggesting return of lamps if we have furnished with them.

1/21/13- Waiting them for answer to previous

3/26/13- Have them installed on 32 flow of Sal connected to 20 cells Battery. Will run Dick. Perfect

4/3/13- Have run them with B² + B⁴ cells but not satisfactory because all cells showed B². Have ordered B² cells. awaiting.

5/2/13.- Operating on 120 V. circuit, charge 20 B² cells in 7 hrs + they operate 6 - 30 V. 20 watt lamps for 15 to 16 hrs, voltage from 30 to 20. With autumn Williams answer letter today.

5/3/13- Ordered list discontinuing + cells rely.

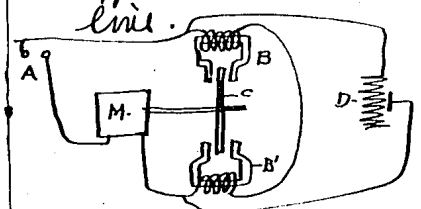
Automatic Governing Gear for Electric Motors.

3/20/13.

For use on Electrically driven phonographs, Kinetophonographs &c.

Some months ago I sketched up a governing system which is now almost a necessity on Kinetophonographs.

The principle is a disc of copper rotated by the motor between the poles of one or more electro magnets. These electro magnets are in series with the motor and the retardation effect varies with the E.M.F. of the circuit.



A = terminals of line
BB' = Electro magnets having horse shoe poles
C = metal disc on motor shaft
D = Variable Resistance shunt.

Suppose a = 220 volts. m = 110 volt motor & p.d. around B-B' = 110 Volts. Varnish say under these conditions that rpm of motor = 1000. As Voltage rises & motor tries to speed up, the

retardation effect by increase of strength of B-B' will act against it.

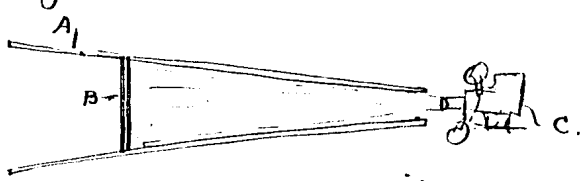
We can arrange these magnets so as to adjust them radially from center of disc and also to separate the poles as desired, or both.

The variable shunt will have one of several apparent ways to adjust the speed of the disc.

MKH 3/20/13

3/26/13. Norton working on this.

Daylight HPK. Window Display



A = Pyramid turned inside
B = Ground glass
C = Kinetoscope (HPK)

all interior surfaces of A are Black.

Persons passing Large end can see motion picture ~~thereon~~ on ground glass.

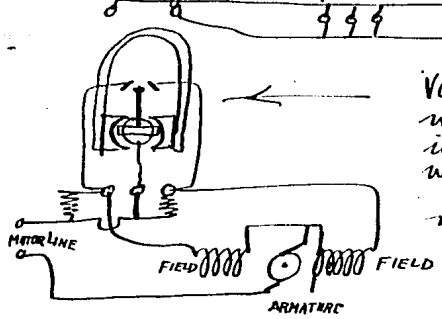
3/22/13 - Duplicate Expt. in yard with 6 V. Battery Lamps but not enough light intensity. Will await the completion of Battery Lamps Experiment.

Voltage Controller for Marine Work

3/24/13.

The present type Controller is unsatisfactory on board ships as the unsteadiness of the vessel causes the Controller to "hunt"

I have installed a Weston ~~Relay~~ device which operates on 2 volts difference above & below standard voltage, and it works very well.



Voltmeter type Relay which cuts resistance in & out of motor circuit, which is always closed
Diagram shows motor circuit only.

Will arrange the contacts so they will scrape.

This device operates regardless of ~~extent~~ to which controller as a whole is rocked or shaken.

4/10/13 - Made up two outfits. Work OK.

Film Developing Machine -

3/22/13. — X — (Sinwidkis)

When D. stopped work on this machine last October the difficulty was control of temperature of room.

He now proposes to blow filtered air into the room, through one passage containing a steam radiator & another parallel one containing ice box or other cooling medium. The steam to be used when air temp outside is ~~over~~ below 67° & the cooler to be used when above 67°.

Proposes to install a device for automatically controlling this.

The air, to dry the film, is to be heated to 80° & escapes to the roof after passing through drier.

Proposes to also agitate the developer.

Stereoscopic Kinetoscope Screen.

Tonight Mr. Edison called me to Chemical Room, placed book, slightly opened, on end on table and seated me in chair at such location that when I shut one eye I could see one cover, and other eye the other cover. He has an idea that a screen made up of proper vertical "flutings", of such conformation as will give everyone a two eye vision of two pictures running synchronously, will produce stereoscopic effect.

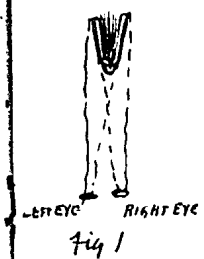


Fig 1

Fig 2

a screen laid out so that the entire audience will get the effect of fig 1 from some screen may be possible. Will lay it out.

Telephone Reproducer
(Bus. Phone)

3/27/13. - In Stock Gur.

Start & Stop Hand Trip-

Bus. Alum

→

3/27 Has now a spring attachment for applying to speaking tube.

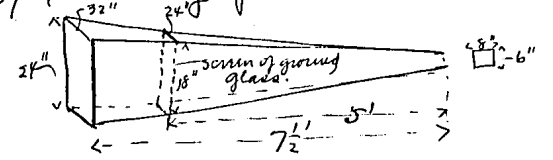
Pneumatic Start & Stop Attachment for Typewriter

3/27 - Model completed & arranged to attach to either Underwood or Remington Typewriter. Submitted to Durand.

Cheap Hand Shaving Machine
(Bus Plan)
3/27 - will be called "Open frame Shaver." Completed.

Daylight Screen Box. (HPK)

3/27. Survey past work made up box



Pretty fair indoors with Nernst.
Balls with incandescent lamps
Outdoors No good.
Discontinued to await incandescent lamps development.

Locomotive Head Light

4/5/13

1500 naked cp. motive reflector

Morrison Mc Dempsom + I talked over
in my office.

Dempsom will get Judrine outfit &
arc head light & we will adapt
Edison Ballast.

4/6/13 - Morrison + Dempsom tryed lamps.

4/24/13 - Lamp used and set up for test.
Chester assigned to job.

Special 60 Volt Motor

—x—

4/3/13 - Armature core, commutator & assembled ready for winding.
Armature coils being formed by Elect. Dpt.
Field coils being made in Lab. All castings, wire &c on hand.

4/10/13 - Castings in process of machining, Field coils wound, Field frame assembled.
Armature in process of winding.

5/2/13 - Jones reports he wound armature as Mr E. had instructed & got only 595 rpm. Removed old armature from Wagon motor, used old motor fields & got 1708 rpm on 60 Volts.
See Jones report 5/1/13.

Professional Kinetoscope
Incandescent Lamps. 4/3/13.

Efforts are being made by G.E.C. to make us a 110 v. 120 c.p. very high candlepower lamp for large machines in small theatres.

H.P.K. Nernst Lamp with Diaphragm.

4/3/17 Made expts. with Nernst lamp, by placing metal aperture plate with one pair one globar. Compared with another machine, same film & with all the light from the Nernst used. The aperture plate one was very different. Further data going on.

Synchronous Motor Drive for Kinetoptikon

4/3/13. Norton in this pt. Repeats 2 phase motor drive OK. Now busy driving Kinetoscope from motor, driving away with synchronizer.

4/10/13 - The 2 phase syn. direct operation very well. Motor driven Kinetoscope W synchronizer used.

Direct current fed to Phonograph motor. Collector rings on armature. 2 phase (or 3 phase if desired) fed to collector rings on armature of Kinetoscope motor, the field of which are excited by D.C. Between motor and Kinetoscope is a differential. When gear arm is held by operator, Kinetoscope is driven. Norton at work now making drive more commercial.

Stephy Step Synchronous Series
In Kinetoptikon

4/2/13 — model made up but not
for test.

Experiment

Elimination of Flicker in Prof. P.K. Machine

-x-

4/10/13 - Ten experiments have been completed with following results:

1st 2 machines. One carries film. The other projects various colored lights of various intensities, the said lights being on screen during period of obscuration of film. The result was unsatisfactory. If white light used, the shadows of the pictures are grayed. If colored glasses used in #2 machine, the result is that the colors are caried, by the retina, over the pictures, producing colored effect. Flicker ray slightly reduced.

2nd Tried shutters in only one machine, doing away with other machine. When flicker was reduced, "travel ghost" took place. Many combinations of shutter blades were tried but were as good as our standard shutter.

3d The greatest fatiguing effect & the eye is produced by unsteadiness of picture, caused by movement of film crossing in shutter. Only apparent remedy.

Double Row of Pictures on PK Film

4/10/13 - M. E. wants to make expr. to see what result of two rows pictures on PK. six film. This would give 1000 ft. equivalent in 500 ft and possibly more equivalent. Also would reverse unnecessary. Will get at it as soon as possible.

Home Kinetophone.

Apr 10/13 – M. E. has expressed desire to get up a home Kinetophone by connecting phonograph & Kinetoscope by simple sheaff or other synchronizer. Will get at it soon as possible.

5-6 Cells - New Grids.

4/14/13 - Results show 1½ hrs @ 600 amp to 1 volt. after charge as per specifications. Very good curve.

Rectifier (continued from page 4).

Lead Battery Type:

Single unit, to rectify 5 to 10 amp, max. Volts 35.

+

Rectifier (Imp. 4).

5 units in Series on 110 V.,
20 amps flowing.

4/24/13 - Cluster upata: Made Jewitsta with high voltage in contacts Jewigle with amp charged at 80 V. 10 amps. mitunth holding an arc. Now using 2 units in series on 80 volts to increase length Jbrisk.

Rectifier – (Jump p. 4) 86

Two Wave, 2 units,
25 amps. 10 V., with possibility
of going to 25 amps 30 V.

~~4/24/13 Report Cluster states has run up to
50 amps @ 10 V.~~

4/24/13 Cluster reports: The two wave rectifier has now been in continuous operation for 216 hours charging ~~to~~ 82 @ 22 amps. One of the graphite contacts has broken off – but is being continued without replacing same. To prevent same am putting graphite on back of copper armature.

Rectifier (Jmm p. 4). 89

Single Wave 35 amps. 25 V.

Rectifier (p. 4). 90

Spring Cushion; copper Contact Slotted.

Rectification. (p4) 91

Sliding Contact, Single wave, 30 amps.

W2

92

Reflector for Cap or Mining Lamp

—x—

The present layout is unsatisfactory. Reflector cap lamps & flare lamps set in dry side and hence - Physical movements.

Spring Motor Driv Kinetophonograph

4/24/13.

This has been completed some 2 weeks.

Consists of disc machine Springs and Spring Barrels.

3 are mounted so as to engage one driving shaft.

Runs 1½ records and drives 700 ft. of cord running 46 pulleys OK.

Quartz Reflector for A. C. arc Lamps

Mr Edison wishes expt made on properly ground quartz reflector, Platinized surface, & reclaim some of the light lost by reason of absence of water in trough when a.c. is used
assigned Rudolph to job on 4/22/13.

Boxwood Inclin pcs. on
Phonograph Motors

4/24/13.

Some months ago Geo Gordon suggested replacing Fiber with Boxwood pcs, ~~and~~ held in paraffin. I had a disc motor made up and it ran OK. In about 3 weeks. Then the matter was dropped for reasons which I cannot recall.

Now on 4/24/13 I am again taking the matter up and have equipped a disc motor & arm running same all day.

6/2/13 - Report as follows -

4/24	79 rpm	28	83 rpm
25	80 "	29	83 "
26	83	30	83 "
27	Sunday	5/1/13	adj to 80 rpm
		5/2	80 rpm

Magnetic Blower for
A.C. Arcs
of Kinetoscopes

×

5/2/13 – Rudolph suggests a magnet behind carbons to keep the arc on condenser edge & thereby produce cleaner arcs & reflectors. Going ahead with it.

Rectifier applying to
A.C. arcs for
Kinetoscope

×

Chg Batteries or recharge current direct.

Negative films in
wake known decomposed.
Badly perforated. Why?

[THIS BOOK WAS USED IN BOTH DIRECTIONS.
THE FOLLOWING PAGES WERE FILMED FROM
THE BACK END FORWARD.]

House ①

First Floor

Front Porch. (1) 1-40

2 ceiling Domes, one switch control.
1 2 gang wall recp.

Side Porch - (2) 2-40

1 Ceiling Dome - one sw. control.
1 - 2 gang W. Recp.

Dining Room (3) 1-40

1 - 3 wire 5-light outlet centre. 2 sw.
1 - 2 gang wall recp.
1 - 2 " Floor plug.

Living Room - (4) 1-40

1 - 3 wire 5-light Outlet centre. 2 sw.
1 - 2 gang wall recp.

Hall - (5) 2-40 2-20

1 - 2 light centre light 2 sw. control
1 Wall recp (2 gang) top of mantel.

Bed Room - (6) 2-40 2-20

1 Centre - 2 light pull control
2 wall Bkts
1 2 gang wall recp

Bath Room - (7) 2-40 2-20

1 - Centre - 2 light pull control.
2 - wall Bkts.
1 - 2 - gang wall recp.

B Room Closet - (8)

1 drop. 1-20

Butlers Pantry - 1 bracket. 1-20 pull.

(9)

Kitchen - (10) 2-40

1 - 2 light centre drop.
1 - 2 gang wall recp.

Servants Dining Room: (11) 2-40

1 - 2 light drop.

Servants B Room - (12) 1-40

1 - 2 light drop.

Outside Corner (13) 1-60

1 - waterproof fixt. switch inside.

Second Floor.

Hall – 1 – 2 light dome. (19) 2-40
1 – 2 gang outlets (wall) with separate circuit & panel Bd.

Front Bed Room: (20) 2-40 2-20
1 – 2 light centre fixture pull
2 wall Brkts on sides of dresser.
2-gang outlet

Second Bed Room: (21) 2-40 2-20
1 – 2 light centre pull.
2 Back Brkts on sides of dresser.
1 – wall 2 gang outlets.

Third Bedroom – (22) 2-40 2-20
1 – 2 light centre pull
2 – wall Brkts on dresser.
1 – 2 gang wall outlets by door.

Sleeping Porch: (23) 2-40 1-20
1 – 2 light fixture, sw. control by door.
1 Bracket by closet.
1 – 2 gang wall outlet.

1st Floor (continued) (3)

Ctr Box Room – (14) 1-20
1 – 1 light drop.

Rear Passage (15) 1-20
1 Wall – Flush.

Basement (16) 3-20
3 – 1 light drops. switch by door

Laundry – (17) 4-40
2 – 2 light drops Overhead pull
3 Wall Outlets in Conduit

Gardners House (18) 2-20
2 – 1 light drops, one in garage to have sw. in g. room

Arrangement

Battery, Voltage Controller and Switch Board in Cellar East room.
2-#8 Wires from garage to cellar
2-#12 " " " " "

Engine & Dynamo in garage.

Run Telephone Wire in conduit to garage.
Run in same conduit a pair of wires for local phone.

Second Floor (Cont.)

Back Stairs — (24) 1-20
1-10 watt flush Recep.

#4 Bedroom — (25) 2-20
1-2 light center fixture

#3 B Room (Rear) (26)
1-1 light center. 1-40

Attic (27) 4-20

1-1 light drop in B Room
1-1 " " " West room.
1-1 " " in center room with switch by stairs
1-1 " drop in East room.

Garage: (28) 8-40 1-60

1 conduit all around with 6 outlets.
2-4 light pullead drops, 2 sw. control.
1-Outside Bracket w/ plug, switch inside.

Improvements to Grounds
Woodside.

—— x ——

STRAWBERRIES: Cut old plants as close as can. RAKE. Plough or spade 6" between rows, put fertilizer (manure) in each spade it in. Immediately the runners will commence to form and next year the plants will be where you now spade in manure. Be sure to remove all old leaves and cut bare. In Sept or Oct spray once with Bordeaux mixture. Cover before frost, but watch until there is a little frost or snow. Use hay. 3 or 4 inches.

In spring remove the hay from the centre but leave between rows.

—— x ——

Blackberries:

Just as soon as crop is over, cut out old canes and keep the new canes low. 3½ ft. A cane that is cut off will branch and make new branches & they bear the berries. Berry with soil in the fall if new required. Put potato fork under plant and let man pull on so as not to break the roots. Lay all in same direction so will overlap like fish scales, but aside of each other. In spring take earth off, shake, and lift up slightly. So this before buds form

Drains:

Open the ditches on the two sides of the road. Also drain pipes.

Above middle of patch of raspberries there is a wooden box for drain. Make a cement box.

Put a cement box down in the low place. Connect the 1st box with the second one by pipe. This keeps water from being dammed in the ploughed ground. One or two short trenches with tile placed and to end — possess tile:- Hay underneath, tile, Hay on top &c.

Cistern: Syphon out in Fall and clean out. Put lime or bag of charcoal in the cistern.

Drains on House:

Open up and take the discharges away from house.

Fertilize in Spring or Fall as have time.

When they blossom trim back or as to cut out two inches from. Cultivate very frequently and mulch with old grass or hay.

Raspberries:

Get all old canes out, cut them back, and cultivate very thoroughly up to about Sept 10th. Not later because will have canes growing & grow so long they never ripen.

Lay down or cut as have time, just same as black berries.

Best to renew them every 4 or 5 years.

Garden: Plough in Fall — about Oct 1st. Plough the fertilizer in. M.T. made arrangement to get some fresh soil from Minn. & St.L. R.R. Mann was to haul it from Minnewaukta. May be able to get Dr. Miller to haul it. Mr. Thygeson may be able to get it for us. The dirt is in their way.

Apple Trees:

Sour cultivate around them after Sept 15. No grass must around.

Sept or Oct. wrap with burlap and be sure there is no hay around bottom. Put copper wire around bottom and pile enough dirt around to cover the wire. Pack tightly.

Early in March prune them - an expert - Burr Stephens Nursery man to prune them. Or get Hackman of the Exper station, to show Waldo. Cover the ends of limbs pruned, with wax or tar, before the sap comes up.